IAFF 6501- 11
Applied Quantitative Analysis

Extra Presentation Slides on IQR & Probability

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Calculating IQR with an even number of cases

- To calculate IQR we apply the following formula: *IQR* = Q3 – Q1, where Q1 = score value at or below which 25% of the cases fall and Q3 = score value at or below which 75% of the cases fall

- To find Q1, find the median of the 1st half

- To find Q3, find the median of the 2nd half

- **For more complicated cases (even number of values) you must apply the following formulas first prior to subtracting *Q3-Q1*:**
  - **Position of Q3 = .75(N+1)**
  - **Position of Q1 = .25 (N+1)**
  - **These tell you between what two score positions the median falls**

Review this example. Remember, when you have an even number of cases, you must first apply the formulas on the prior slide to find the score position presented.

Find the IQR: 18, 12, 9, 14, 20, 27, 3, 17, 5, 10

- 3, 5, 9, 10, 12, 14, 17, 18, 20, 27
  Position of Q3 = .75(10 +1) =8.25
  Position of Q1 = .25(10+1) = 2.75
  Q1 =7
  Q3 = 19
  IQR = 19 – 7 = 12

Probability Rules

Probability Addition Rule:

P (A or B) = P(A) + P(B) – P(A and B)

If A and B are mutually exclusive, P(A and B) =0, then
P (A or B) = P(A) + P(B)

Example 1: Odds of drawing a heart or spades from deck of cards =
13/52 + 13/52 = 26/52 = .50

Example 2: Odds of drawing a king or clubs from deck of cards =
4/52 + 13/52 – 1/52 = 16/52= .31

Learn more about the Addition Rule by accessing the video at the following link: http://www.youtube.com/watch?v=DOooyE6liLY

Probability Multiplication Rule:

P(A and B) = P(A) * P(B|A)

If A and B are independent events P(B|A)= P(B),

*then P(A and B) = P(A) * P(B)*

Learn more about the Multiplication Rule by accessing a video at the following link: http://www.youtube.com/watch?v=Q_7PR9kRXWs

To learn more on probability in a more interactive way, access the following link:

http://nces.ed.gov/nceskids/chances/index.asp.

The link answers the question – if you rolled 2 dice a bunch of times and plotted the totals, what would that distribution look like?